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HOW TO IMPROVE 'PASSION PHOTOGRAPHY' OF SPIDERS

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(All photographs by the author)

ABSTRACT

Colour and patterns on spiders are highly variable depending on their adaptation to the habitats and ecological niches they live in. Polymorphic patterns and colour variations often within the same species of spider create more challenges in spider taxonomy. A spider, therefore, cannot be identified and authenticated based on a photograph only. Taxonomic identification and recognition of species in most cases are based on the structural diagnostic differentiation of sex organs. However, photography, especially macrophotography can be very useful in recognition of spider families as this recognition is based on the spatial arrangement and relative size and direction of their four pairs of eyes. Further, photography will form an excellent record of the external morphology including primary or secondary sexual organs, their shape and structure. Such diagnostic differences often form the basis to distinguish between sexes and also in the recognition of few genera and species. Photography aided with graduated scales is very useful in visually portraying the length of the body of spider and its appendages. Relational depiction of size based on using thumbnail can often reflect relative size differences among spiders. Photography in a series of sequence shots, time-lapse photography and video clips are of immense use in capturing important biological phenomena such as hunting behaviour, web-spinning, moulting and mating.

Keywords: Spiders, passion photography, macrophotography, polymorphism

INTRODUCTION

Spiders are good subjects for photo-enthusiasts. Their unique appearance, colour and patterns attract not only arachnologists but also many photographers who have passion for nature photography. Passion photography of spiders has enormously increased in recent years and has contributed to an enormous public interest and curiosity in spiders. Photographs of spiders posted, published in social media have added further to recognizing new reports and new information on spider distribution. The identification and nomenclature of spiders reported in the social media need to be treated cautiously as these are mostly identified based on appearance and their resemblance to spiders already authentically identified.

Once a spider is photographed, the very next step is curiosity. Which spider is this? Can someone help with the identification. The sharp answer is "NO" to identifying a spider just based on a photograph. However, considering that passion photography of spiders has increased as seen in the social media and that one can comment on the identity of the spider to its family and possibly the genus. In this connection, it needs to be suggested to the passion photographers that the photograph of the spider in question should be reflective of a natural set up where it was found. The background shown can reflect on where the spider is generally found and also about its possible behaviour. Figure 1 depicts pictures of few spiders photographed in their natural habitat.

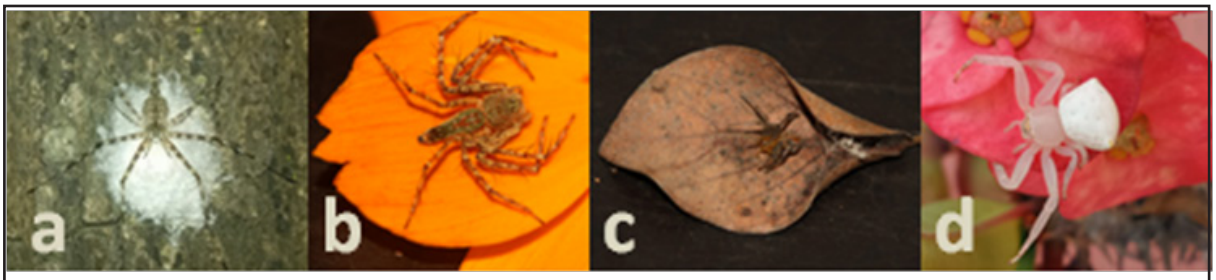

Figure 1 Reflection of few spiders in their natural habitats. a. *Hersilia savignyi*, b. *Hamadruas* spp., c. *Parasteatoda mundula* and d. *Thomisus spectabilis*

The photograph should be sharp, complete, with 'full body' and preferably a full 'dorsal view', ventral view, front view with pedipalps and eyes and a side or lateral view. Capturing a full dorsal view and detailed ventral view of spiders will greatly assist towards their recognition.

Full dorsal view: Some of the examples of photographs of full dorsal view of spiders are shown in Figure 2. As it can be observed, the advantages of taking a full dorsal view include display of natural colours and patterns, relative size and shape of prosoma and opisthosoma, and more importantly the length and directional arrangement of legs, especially when the spider is at rest. This feature is useful in taxonomic diagnosis. The relative differences in size and shape of the prosoma and the opisthosoma pose a challenge in the plane of focus.

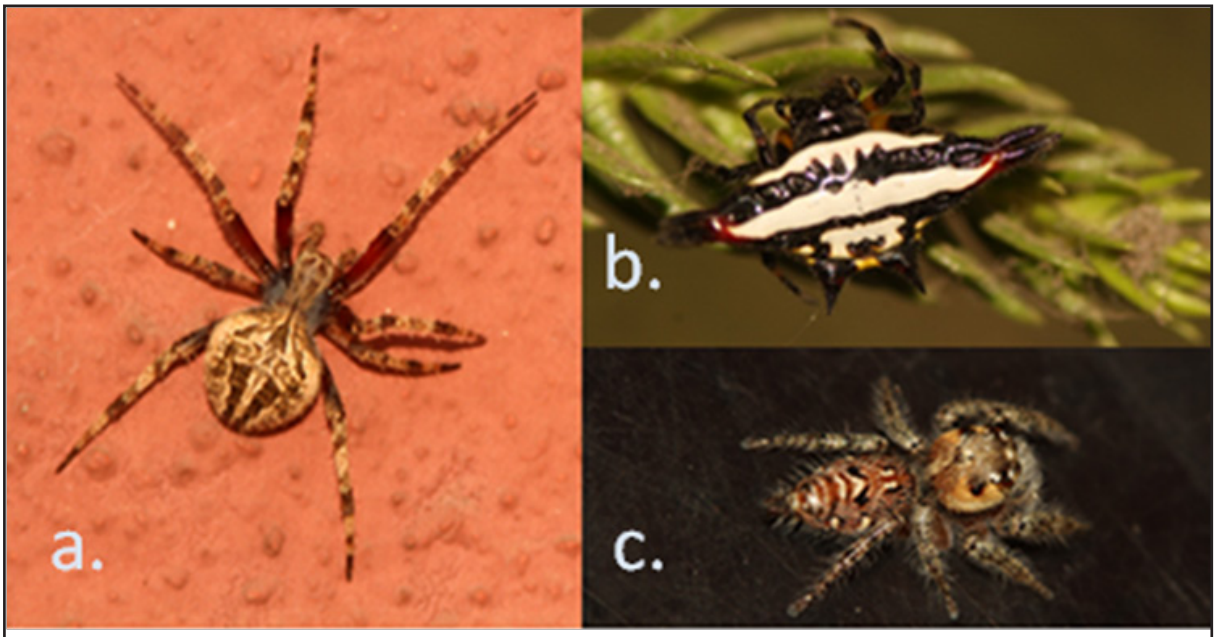

Figure 2 Dorsal view of a. *Neoscona vigilans*, b. *Gasteracantha geminata,* c. *Hyllus semicupreus*

Need for a full ventral view: Photographing a spider with a full ventral view is equally important as it would reveal the shape of the sternum, position of booklungs, epigyne in adult females, and pedipalps (tips swollen in males). Some examples of full ventral view of few spiders are presented in Figure 3. Studying patterns and markings on the ventral side of opisthosoma are often important in diagnostic identification of spider genera and species.

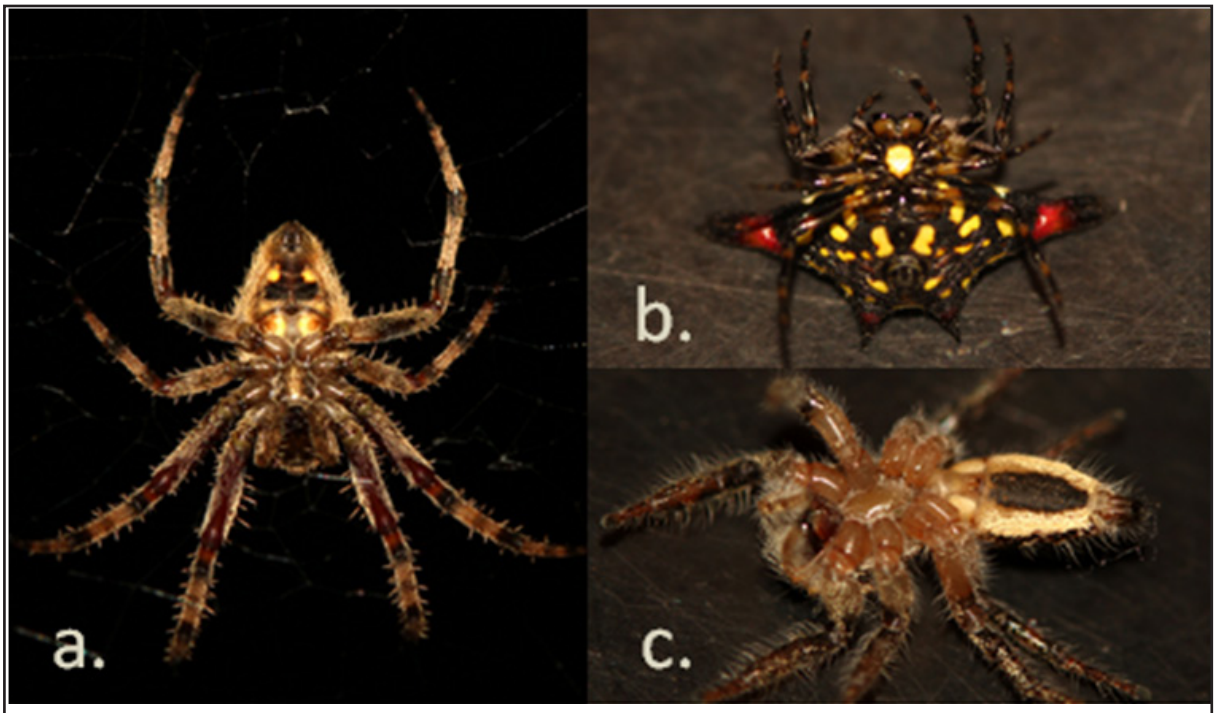

Figure 3 Full ventral view of a. *Neoscona vigilans*, b. *Gasteracantha geminata,* c. *Hyllus semicupreus*

Capturing Eye arrangement: A good close up of the eye arrangement is always helpful in assigning a particular spider to a family or to a larger group. Spatial distribution and the size of the eyes and the direction of pointing are traits that are consistent among families. Eye pattern in Salticidae is captured in Figure 4, showing a frontal view of prosoma of the jumping spider *Telamonia dimidiata*.

Figure 4 Frontal view of prosoma of *Telamonia dimidiata* with eight eyes

Macro photography with 1:1 magnification or higher, of frontal region comes very handy. With a macro lens, one can get close to the spider than that with the ordinary lenses. Figure 5 provides example of photos illustrating eye arrangement in some spiders. Some of the key challenges involved in photographing spider eyes include, their location, small size, often pairs of eyes (eight eyes in four pairs) are far apart and point to front, sides, rear and the top. Eye patterns can reflect families of spiders more appropriately (Figure 6).

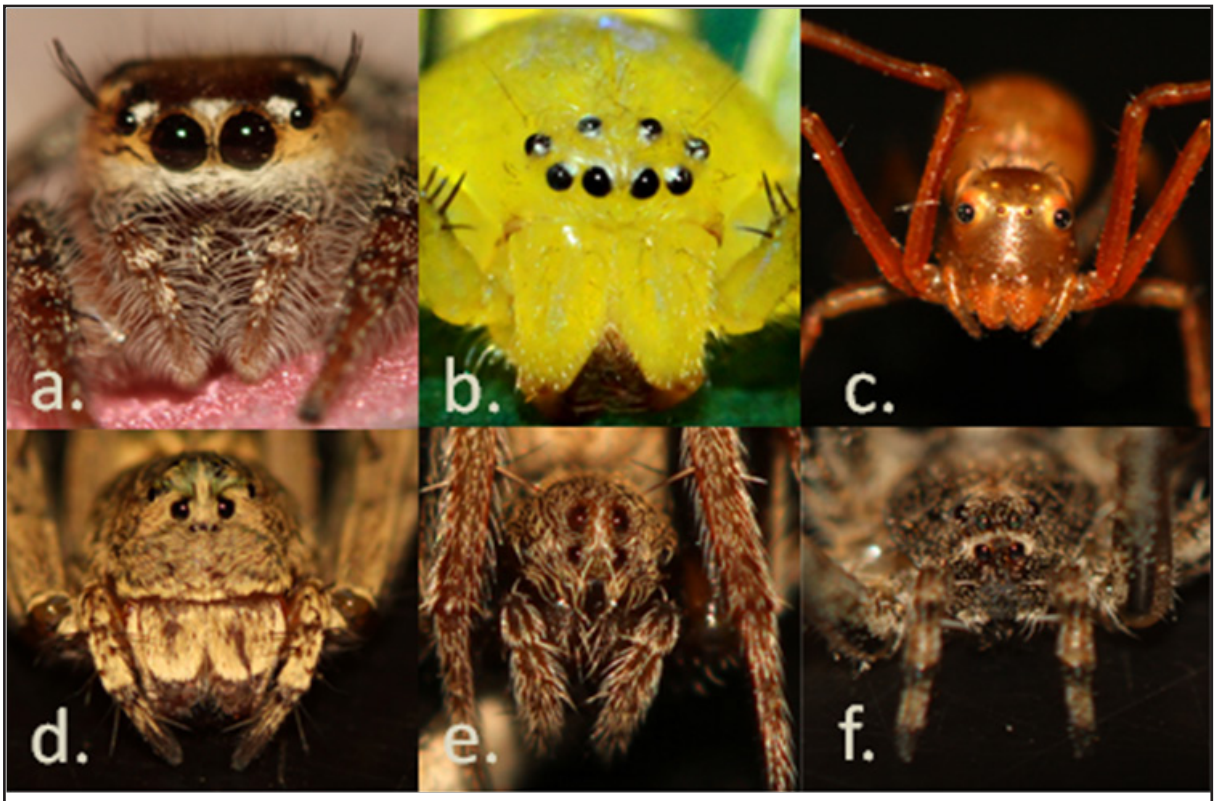

Figure 5 Eye arrangement. Top row: a. Salticidae (*Hyllus semicupreus*), b. Sparassidae (*Olios* sp.), c. Thomisidae (*Amyciaea forticeps*)., Bottom row: d. Oxyopidae (*Hamadruas* sp.), e. Araneidae (*Eriovixia* sp.) and Hersiliidae (*Hersilia* sp.)

Figure 6 a. small eyes of the crab spider *Thomisus spectabilis* typically on an elevated 'cone' and b. Large eyes of the jumping spider *Menemerus bivittatus*

Pedipalps: A pair of pedipalps as mouth parts are always present lateral to chelicerae and can be diagnostic aid in distinguishing male from female spider. In male spiders, the tip of the pedipalp's tarsus is swollen into a palpal bulb and often differently coloured. The females on the other hand have normal pedipalps that are lacking a swollen tip (tarsus). These are illustrated in Figure 7 with exhibits from male *Epocilla calcarata*, female *Carrhotus viduus* and it's ferocious looking male.

Figure 7 a. *Epocilla calcarata* male, b. *Carrhotus viduus* female, c. *Carrhotus viduus* male

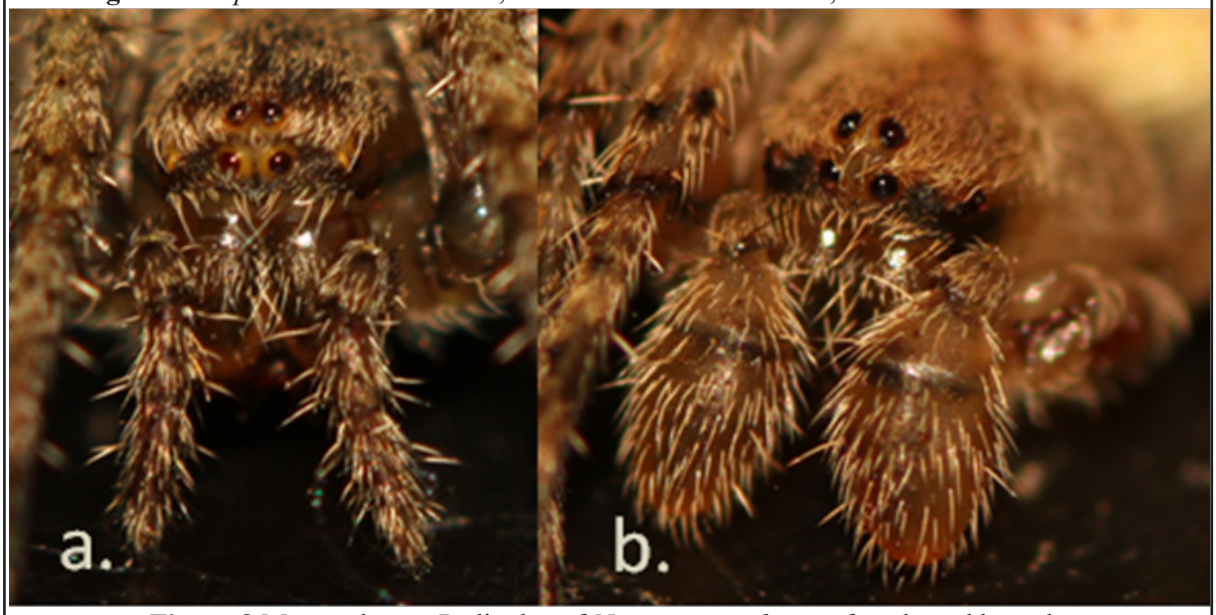

Figure 8 Macro photos: Pedipalps of *Neoscona vigilans* a. female and b. male

Macrophotography using a 100mm lens or some times using a 65mm macro lens, can reveal very detailed external morphology and structure of the male pedipalp. It should however be pointed out that use of extension tubes in macrophotography can restrict the light and can be a limiting factor. Similarly, using a 65mm macro lens beyond x2 can affect the light and the conventional flash nearly useless. A ring flash, or twin flash in place of the conventional flash can circumvent the challenge of lighting. Macro photos of pedipalps of *Neoscona vigilans* are illustrated in Figure 8. The swollen terminal parts of pedipalps, as can be seen, are also densely clothed with hair. The difference between the pedipalps in male and female is very prominent in many spiders.

Although, morphological features of pedipalps are important, differences in the internal structure of pedipalps in the male constitute a key diagnostic feature in differentiating related species and good illustrations are very critical for arachnologists for the taxonomic diagnosis of the spider species. Passion photographers are not expected to provide anatomical details.

In some spiders, such as *Neoscona*, *Araneus* and *Hersilia*, the male pedipalps very distinctly have swollen tips also called ‘palpal bulbs’. The actual copulatory organs are present in the

palpal region. Figure 9 illustrates the pedipalps in *Hersilia savignyi* (male) with a macro photo of a single pedipalp. Sometimes, the pedipalp could be broken or totally missing. In few spiders such as *Nephila*, the male is known to break the pedipalp into the female epigyne and form a 'plug'. It is not uncommon in nature to find male spiders with one pedipalp missing or damaged. It is also not known if the damaged pedipalp is 'healed' and made functional again or a totally new one gets regenerated. The regeneration of lost leg or legs in spiders is already well established. During photography, care should be taken not to cause any damage to the legs or pedipalps. This would create unwanted trauma to the spider.

Figure 9 a. Frontal view of pedipalps and prosoma of *Hersilia savignyi* male and b. one of the two pedipalps enlarged

Figure 10 Macro photo of lower side of the abdomen of *Neoscona vigilans* showing epigyne

Epigyne Photography: The external lobate or simple labial structure is part of the female sex organ and is known as the epigyne. The shape and structure of the epigyne are very useful in identification of the female spiders. It should be noted that the epigyne is fully formed only in mature adult female spiders. Epigyne is too small in many and hence it is difficult to capture the details. Using a macro lens further magnifies the size and shape of epigyne, but reduces the

area under focus. A macro lens further magnifies the size and shape of epigyne, but reduces the focused area. Illustration in Figure 10 displays the ventral side of abdomen of *Neoscona vigilans* with special focus on the 'epigyne'.

Spider on a thumb nail: Description of spiders includes size measurement, and expressing the general length of the adult spider in mm/cm precluding the appendages on a 'head-to-tail' concept. An approximate way to indicate size is to display the spider on your thumb-nail. This is an easy way to portray relative size, especially in the field when a scale is either not available. Live spiders always glitter with natural sheen, colour and pattern. Hence, use of live spiders is highly suggested for the body measurement. However, one needs to be cautious considering that a nasty bite cannot be ruled out. During my two hundred or more photo sessions, I was bitten only once. The pain lasted for few minutes and an antiseptic ointment containing ammonia was applied. One needs to exercise caution and not be afraid unnecessarily. I continue to put live spiders on my thumb nail for photography, rarely on my palm (Figures 11-12).

Patience is the key to get a near perfect or perfect shot, especially while photographing live spiders because of their agility and often refusal to spread their legs. It is not uncommon to find spider photographs in the social media along with a coin or a pencil, that as well can indicate relative size of the spider.

Figure 11 Mygalomorph spider *Poecilotheria regalis* on the palm showing the relative size.

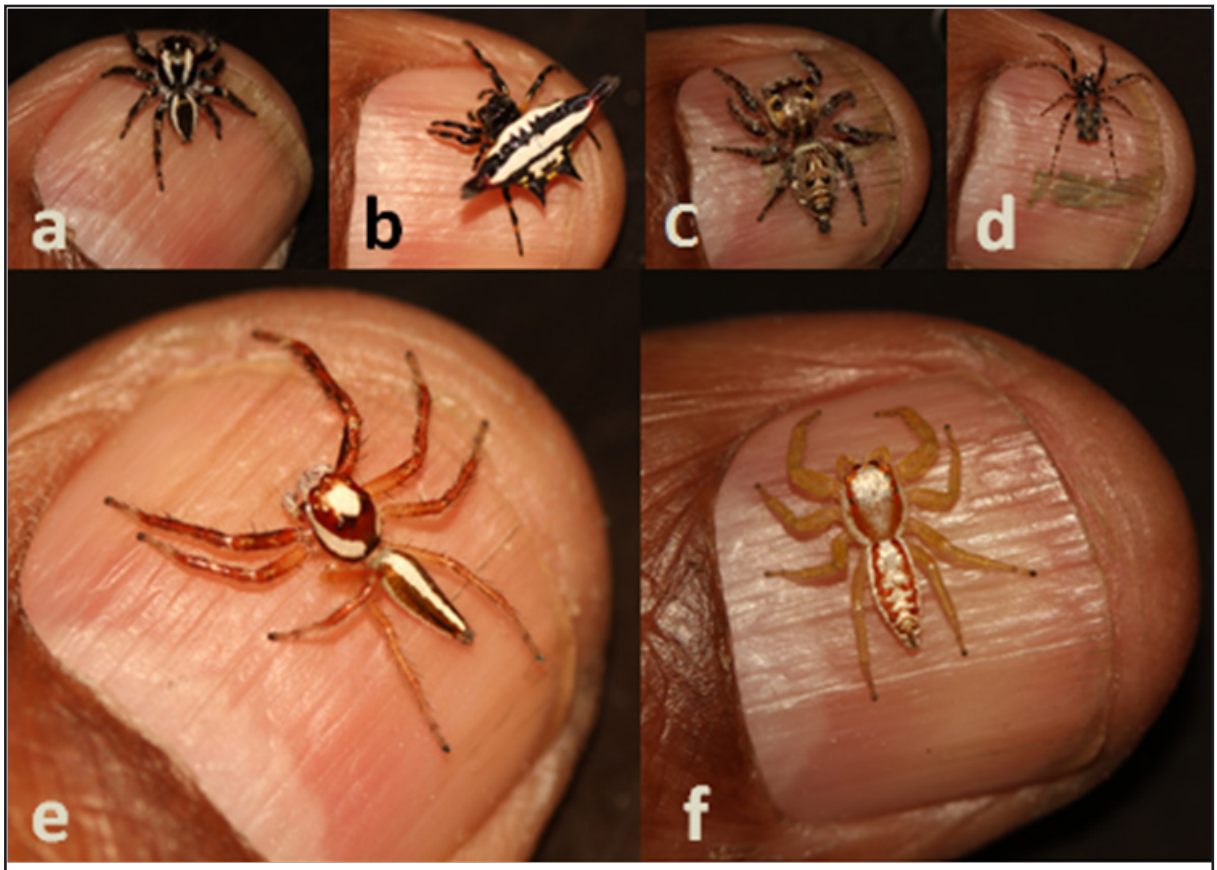

Figure 12 Comparison of relative size of selected spiders on thumb nail background. a. *Carrhotus viduus* (male), b. *Gasteracantha geminata*, c. *Hyllus semicupreus*, d. *Cyclosa spirifera*, e. *Telamonia dimidiata* (male), f. *Epocilla aurantiaca*

Using a CM/MM measuring ruler: A more appropriate way is to photograph the spider by the side of a measuring scale or a ruler. The length can be more clearly measured and expressed in MM for most spiders and rarely in CM if the spiders are big in size. It should be noted that the size generally refers to 'length' starting from oral to the tip of the opisthosoma. The illustration in Figure 13 portrays different adult female spiders and their length measured by employing a mm/cm scale. It is very useful to carry such a scale even in the field. Once again, many photographs need to be taken to get a perfect or near perfect shot while dealing with live spiders and hence patience is the key. It is a common practice to describe the length of the spider in mm and not a fraction of mm. For example, spider measured 8.5 mm is interpreted as length reaching 8 to 9 mm. It should also be noted that for measuring the length, fully grown adult spiders are selected as opposed to spiderlings between moults or a sub-adult spider as they do not reflect the real length a spider can reach. Use of alcohol or formalin dipped brush or cotton bud to temporarily immobilize the spider can be temporarily dangerous to the spider.

Many a times better images are possible with x1 magnification and then magnifying the photo subsequently rather than taking a photo with x2 or x3 magnification. In extreme macro lenses, the lens gets 'too close' to the body of the spider cutting the light, and further poses the danger of driving the spider away. The spider should not be physically harmed in any respect and should be set free into its natural habitat after the photography session.

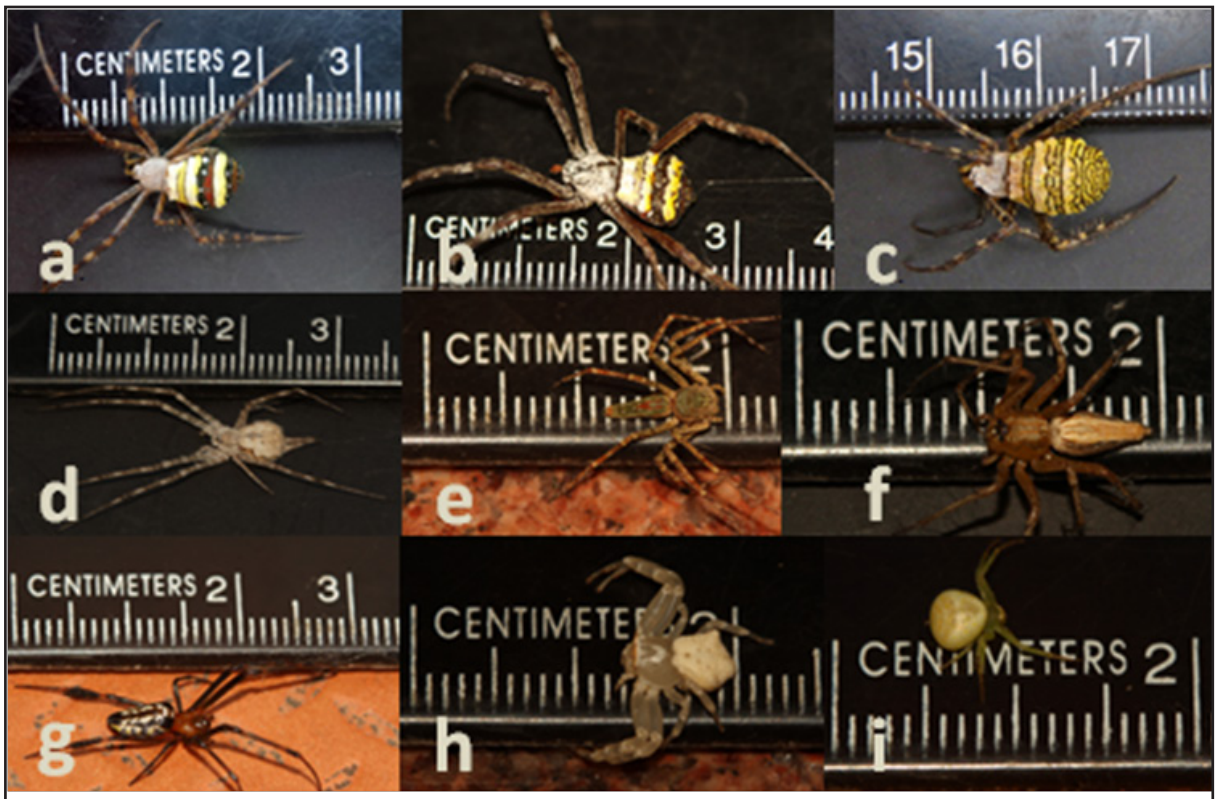

Figure 13 a. *Argiope pulchella*, b. *Argiope anasuja*, c. *Argiope aemula*, d. *Hersilia savignyi*, e. *Hamadruas* sp., f. *Oxyopes* sp., g. *Leucauge* sp., h. *Thomisus spectabilis*, i. *Misumena* sp.

Freezing the 'spiders-in-action' moments: Many passion photographers of spiders are also good observers of spider behaviour. It is therefore not uncommon to find in social media, spider photographs representing an act of spider behaviour. Macrophotography enables us to capture the details of an action as well. Figure 14 portrays two different prey capturing mechanisms. The signature spider *Argiope anasuja* (Figure 14a) entraps the prey in its web, injects venom, and wraps it up to a 'mummy' suffocating it, while the jumping spider *Hyllus semicupreus* (Figure 14b) literally 'jumps' on its prey and holds it tight.

Figure 15 portrays the Green lynx spider *Peucetia viridana* in action, capturing a honey bee. The spider generally hides with its spiny legs retracted and on spotting the prey, pounces on it in a flash. The strong spiny legs of the spider hold the prey motionless preventing from escape. The spider has a further advantage; the green colour of its body blends with the colour of the leaves and helps with the camouflage. The honey bee and sometimes house flies easily fall victims to the spider. Spiders of the family Thomisidae, especially the flower crab spiders such as *Thomisus* and *Misumena* are also well known for their skills in hunting for honey bees. In the social media, there is an abundance of photographs of these spiders along with their 'kill'.

Male spiders are not as common as the female. Further, the male is comparatively smaller and less attractive due to dull colouration. Where a male spider is seen, it is usually associated with its female. Figure 16a illustrates the male (dorsal view) and female (ventral view) possibly in copulation. Also, Figure 16b shows the female *Thomisus spectabilis* guarding the spiderlings. The action photographs of spiders generally are indicative of a story behind. Spider enthusiasts

knowingly or unknowingly often encounter situations of spider activity that appears unique. The photographs posted by the 'chance' behaviour studies include, mating sequence, hunting, escape mechanisms, etc.

Figure 14 a. *Argiope anasuja* wraps a honey bee; encasing it using its sticky silk and activates chelicerae, piercing the fangs into the bee to inject its 'venom', b. illustrates a good example of spider cannibalism showing *Hyllus semicupreus* attacking *Hersilia savignyi*

Figure 15 *Peucetia viridana* hunting a honey bee

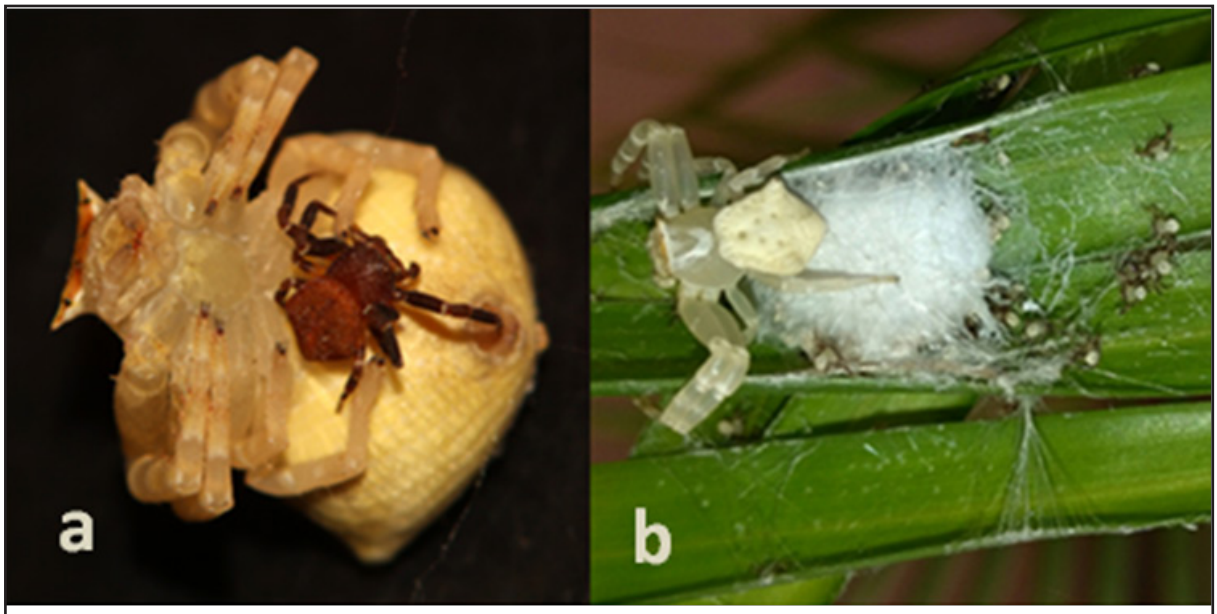

Figure 16 a. Crab spider *Thomisus spectabilis*, tiny brown male copulating with a large white female and b. Spiderlings of *Thomisus spectabilis*

CONCLUSION

Spider photography by photo enthusiasts has increased enormously in the last ten years. This is well reflected in web-based social media. Often the lack of detail, wrong plane, etc. have been a common problem with the photographs leading sometimes to wrong identification. It needs to be reiterated that just by looking at a photograph, a spider cannot be identified or named. As is known, spider identification and taxonomy is based on features such as the structure of sex organs, etc. and not merely on external morphology. However, as suggested in this publication, if photographers give proper attention to detail, plane and angle during spider photography, the spider photos will form a complimentary asset to spider identification. Macro photography with a lens around 100mm can produce better results with 1:1 magnification. Attention may be paid to photographing diagnostic details such eye arrangement, pedipalps, epigyne, etc. Photographing a spider with its full dorsal, ventral, lateral and a frontal view can also assist with its identification. One must also consider taking a photograph reflecting the natural habitat of the spider. This can add to our understanding of spider behaviour.